distance before being re-charged, and "may be compared to a watch which, after being wound up, distributes the accumulated force to make the hands move for a certain time." The machinery at the central power stations is somewhat complicated and consists of a saturating heater or boiler, through which the air is forced with a view to heating it, thereby counteracting the tendency to freeze on expansion. The plant is composed of machinery to create power, apparatus to compress the air, reservoirs to accumulate the air, and devices for loading and piping the air.

As a general rule steam is used as power to compress the air, but in one instance at Berne, Switzerland, natural waterfalls are used in conjunction with turbine wheels.

Notwithstanding all this machinery it has been found to work satisfactorily and economically, and it is claimed that the cars are light and clean, allow no smoke or steam to escape, are noiseless, and do not frighten horses. There is no danger of explosion as from the starting point the pressure always becomes less and less. They can be stopped suddenly if required, as one motion only is required to transfer the power from the motor to the brake. M. Bougenaux concludes his description with a comparison of the cost, and says:

"It has been calculated that the expense will not exceed o fr. 27 per car on the line between the Louvre and St. Cloud and Versailles; o fr. 42 on St. Augustin-Vincennes, and o fr. 26 per car for trains of two cars.

"These figures are interesting when compared with the result of the 'Omnibus et des Tramways Nord':—

"Traction by horses (omnibus, 1893). o fr. 64

"Traction by electric storage battery o fr. 52."

In the Taylor system all the objectionable features seem to have been overcome or reduced to a minimum with the best results.

Briefly stated, the air is compressed by the direct action of falling water without the aid of any moving machinery, and practically without expense for maintenance or attendance after installation.

By this system any fall of water varying in working head may be utilized, and any pressure required can be produced and uniformly maintained up to the capacity of the water power, delivering the compress . air at the temperature of the water, and in a drier state than is possible by any known means of compression, thereby avoiding all loss by condensation or shrinkage by cooling of the air after compression.

For a better understanding of the system, we would refer the reader to the accompanying diagrams.

The water may be conveyed to the compressor by means of an open flume; or, as shown in the diagram, through a pipe supplying a tank or stand pipe round the headpiece of the compressor, where it can attain the same level as the water in the dam or source of supply.

Around the headpiece are placed a large number of small, horizontal air-pipes, dra-ing their supply of air through larger vertical pipes, which extend above the surface of the water and open to the atmosphere.

As the water enters the down flow pipe and passes the ends of these small air pipes, it draws in the air in the form of small uniform globules, which, becoming entangled in the descending water, are carried down to the receiver at the bottom of the pipe, compressing the air by the pressure of the water surrounding these globules until they reach the point of separation. This pressure is maintained so long as there remains any air in the receiver.

The receiver is sufficiently large in diameter to allow the air to rise to the surface of the water therein, from whence it is taken through the air pipe for transmission to be utilized as power or for other purposes. The water, being kept down by the pressure of the air, is forced out through the open bottom of the receiver and up the shaft around the down-flow pipe to the tail race level.

The compressor is so constructed as to permit of its being regulated to furnish any proportion—from one-third of its capacity—using water proportionately with a like efficiency.

As already stated, a most remarkable feature of this system is that, notwithstanding that the air is compressed by the weight of the water and in actual contact with it, the air so compressed is delivered in the receiver and thence to the transmission pipe drier than when drawn in from the atmosphere.

At first sight this would seem impossible, but it is well known that in a high temperature moisture is held longer in air than in a lower temperature, hence the contact of the air globules with the cold water keeps down the temperature usually caused by the compression of air, and the atmospheric moisture held in the globules condenses, as it were, on the walls of these globules, and at the point of separation the air and water are absolutely separated, leaving the air all ready for distribution at the same temperature as the water it has just left, and drier than when first taken in through the small air pipes.

Another feature is that the power of the water can be converted into compressed air at any pressure per square inch, giving the same efficiency at either high or low pressure with a far less loss of energy than by any other process of transforming a water power into transmittable force, and with unvarying pressure.

Should the volume of air taken down be greater than that being used, it accumulates in the receiver until it forces the water below the lower end of the receiver, and the surplus passes up with the return water, thereby forming a perfectly automatic safety valve, without requiring any attendance whatever. It will be observed that the material used in the construction of the down-flow pipe need only be of sufficient strength to carry the weight of water and pressure generated in the working head of the water power, as once it reaches the tail race level the internal pressure is gradually neutralized from that point down by the pressure in the return water surrounding the down-flow pipe; so that any pressure almost may be reached without increasing the strength of the down-flow pipe. The material for the down-flow pipe may be of iron, or wood hooped with iron, and the shaft may be constructed of the cheapest of timber; and as it is preserved by being constantly in the water, there is practically no limit to its durability.

By this system low falls, otherwise useless, may be utilized, and the same pressure obtained as from high falls, the horse power being determined by the diameter of the down-flow pipe, and the height and volume of water in the fall, while the pressure depends solely upon the depth of the well or shaft, therefore any desired pressure can be obtained.

By reference to the diagram it will be noticed that the head piece is telescoped into the down-flow pipe, and raised or lowered by means of a hand wheel on top, thus permitting the flow of water to be regulated, or to lift it above the water level and stopped entirely, and